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AUTHOR Horodezky, Betty
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ABSTRACT

Questionnaires were completed by 62 college professors in a study to determine the specific reading and listening comprehension difficulties students were having in various introductory courses (including humanities, natural and social sciences, and the technical professions), and to determine the instructional techniques used by professors to help students overcome vocabulary and comprehension problems in their respective disciplines. The results indicated that the professors viewed vocabulary as the most difficult problem area in introductory courses. Key principles and generalizations also posed a serious problem. The teaching of metaphors or unique language forms appeared to be less of a problem, but should not be considered unnecessary. Teaching techniques most frequently used included lectures, textbooks, and the chalkboard. Recommendations resulting from the study include the following: (1) particular attention to vocabulary and concepts should serve as an integral component of all introductory courses; (2) generalizations, key principles, metaphors, or other unique language must be taught using a wide variety of techniques and approaches; and (3) more attention might be given to pretesting vocabulary and concepts unique to various disciplines to recognize student deficiencies early in the course. (A copy of the questionnaire and the results are appended.) (HTH)

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PROFESSORS' VIEWS ON BASIC CONCEPTS
AND
READING SKILLS ESSENTIAL FOR COLLEGE SUCCESS

Betty Horodezky
University of British Columbia

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PROFESSORS' VIEWS ON BASIC CONCEPTS
AND
READING SKILLS ESSENTIAL FOR COLLEGE SUCCESS

One of the most important issues facing America today has been the problem of providing more and equal education for all. Each year growing numbers of students enroll in our institutions of higher education with less than adequate preparation for achieving academic success (Stahl, 1982). This point is aptly illustrated in the 1979 Carnegie Survey wherein it was found that a large majority of students were deficient in traditional high school courses. For example:

- 78% had not taken a foreign language
- 35% had not taken a second-year algebra course
- 22% had not taken a geometry course
- 27% had not taken junior or senior English
- 20% had not taken a specific science.

Scores on standardized achievement tests have also been noticeably lower since the mid 1960's. Declines in scores have been reported by (Harnishchfeger and Wiley, 1975), for such tests as the American College Testing Program (ACT), the Minnesota Scholastic Aptitude Test (MSAT), Iowa Tests of Basic Skills (ITBS), Scholastic Aptitude Test (SAT), Preliminary Scholastic Aptitude Test (PSAT) and the National Assessment of Educational Progress (NAEP) among others.

More recently a study on attitudes and opinions concerning the basic skills levels of undergraduate students enrolled at the University of Pittsburgh was reported by (Sartain, Nossen, Bond, Stahl, Haynes and Stein 1982). Through use of a questionnaire 475 faculty members engaged in teaching undergraduate courses at the University of Pittsburgh were surveyed.

An analysis of the 162 questionnaires returned revealed that:

1) More than 60% of the respondents felt that student competencies in skills had declined over the past decade, particularly in writing, spelling and reading; 2) Over 50% of the faculty members cited poor high school preparation as the reason for deficient preparation in skills development, while (3) approximately 30% of the respondents suggested that this trend might be attributed to change of values in our present-day society.

It is not surprising thus that approximately six out of every ten freshmen who enroll in American Junior Colleges and Universities never achieve their expressed goals (Carmen and Adams, 1972). It should be noted this problem is no longer limited to minority unprivileged populations, but to students from "...all walks of life, all levels of socioeconomic background and all levels of ability..." (Roueche and Snow, 1977).

Carmen and Adams (1972) succinctly summarize this problem in the following statements:

Every student is engaged in a battle for survival. This battle is not simply a fight to gain intellectual food and shelter...rather it is for many an effort to endure... Deficiencies in the basic learning skills - reading, writing, listening, remembering, note-taking, and test-taking---are at the heart of most of these failures (PVII).

The problem thus of "how" to educate still remains of paramount concern in America today.

The purpose of this research segment of the Language of the Disciplines Project was thus designed to ascertain from professors their viewpoint with respect to: 1) the specific reading and listening comprehension difficulties students were having in various introductory courses (included were Humanities, Natural Science, Social Science and Professions) and 2) to determine the instructional techniques utilized by professors in assisting students to overcome vocabulary and comprehension problems in the respective discipline taught. A questionnaire

TABLE I

Percentage of DifficultiesWithin Each Category

	<u>Social Science</u>	<u>Natural Science</u>	<u>Humanities</u>	<u>Professions</u>
--	-----------------------	------------------------	-------------------	--------------------

Essential Vocabulary	165	227	192	147
Particularly Difficult	51	64	27	8
Percentage	30.90	28.19	14.06	5.44
Metaphors and Specialized Language	32	23	13	11
Key Principles or Generalizations	76	69	35	28
Particularly Difficult	26	25	9	4
Percentage	34.21	36.23	25.71	14.28

TABLE II

Language Difficulties IdentifiedIn Various Disciplines

	<u>Social Science</u>	<u>Natural Science</u>	<u>Humanities</u>	<u>Professions</u>
1. Essential words	165	227	192	147
2. Metaphors	32	23	13	11
3. Generalizations or Unique Language	76	69	35	28
Total Difficulties	273	319	240	186

Percentage of Difficulties

	<u>Social Science</u>	<u>Natural Science</u>	<u>Humanities</u>	<u>Professions</u>
1. Essential words	60.44	71.20	80.00	79.00
2. Metaphors	11.72	7.20	5.40	5.90
3. Generalizations or Unique Language	27.84	21.60	14.60	15.10

was prepared for this purpose in 1982 (Sartain, Stahl, Horodezky et al). It was based on an earlier pilot questionnaire developed by (Sartain, Stahl et al, 1981). The revised form was expanded to include questions relating to instructional techniques (Appendix A). A sample of 90 faculty members from 13 institutions of higher learning in both Canada and the United States were surveyed for this purpose. A total of 62 questionnaires were completed sufficiently to be tabulated and analyzed. Findings included the following: Essential vocabulary items recorded in question I. were found to be greater in Natural Sciences (227 words) than in the other three disciplines as shown in Table 1. Humanities had the second largest number, 192 followed by Social Science, 165, and Professions, 147 words.

Question II, which required identification of particularly difficult terms from among those listed in question one, showed that Social Sciences had the largest percentage of particularly difficult words (31%), while Natural Science had (28%), Humanities (14%), and (5%) in the professions.

Question III sought to determine the special metaphors or unique language forms that were difficult to learn. The largest number was found in Social Science (32%). Natural Science identified (23%), Humanities (13%) and Professions (11%).

In question IV, key principles or generalizations necessary for literacy in a given discipline were recorded. Particularly difficult generalizations were also identified. Findings revealed that the largest number of generalizations were in the Social and Natural Sciences, (76%) and (69%) respectively, Humanities and Professions reported fewer, namely (35%) and (28%).

In comparing the total percentage of difficulties for each discipline with respect to each of the categories as illustrated in Table II, a) vocabulary; b) metaphors; and c) generalizations or unique language, it was found that vocabulary comprised the greatest percentage of difficulty in all four disciplines - 60% in Social Science, 71% in Natural Science, 80% in Humanities and 79% in the Professions.

Generalizations or unique language terms were identified as the next most difficult from among the total difficulties with 28% in Social Science, 22% in Natural Science, 15% in Humanities and

TABLE III

Most Effective Instructional Techniques

	<u>Natural Science</u>	<u>Humanities</u>	<u>Math, Statistics, Computer Ed., Accounting</u>	<u>Social Science</u>
1. <u>Lectures</u>	91.0%	94.1%	88.0%	83.0%
2. <u>Chalkboard</u>	64.0%	65.0%	75.0%	75.0%
3. <u>Textbooks</u>	55.0%	53.0%	63.0%	50.0%
4. <u>Discussions</u>	45.0%	65.0%	75.0%	71.0%

TABLE IV

Techniques Most Frequently Used

<u>Natural Science</u>	<u>Humanities</u>	<u>Math, Computer Ed., Stat., Accounting</u>	<u>Social Science</u>
Lectures 91.0	Lectures 94.1	Lectures 88.0	Lectures 83.0
Textbooks 55.0	Discussions 45.5	Discussions 75.0	Discussions 71.0
Recitations 45.5	Demonstrations 35.5	Syllabi 36.0	Demonstrations 38.0
Transparencies 64.0	Outlines 18.0	Textbooks 63.0	Textbooks 50.0
Models 45.5	Chalkboard 65.0	Chalkboard 75.0	Content handouts 58.3
			Tutorials 33.3
			Recitation 21.0
			Chalkboard 75.0

3 of the 4 used discussions most frequently

3 of the 4 used chalkboard most frequently

3 of the 4 used textbooks most frequently

15% in the Professions. 7. Metaphors comprised the smallest percentage of difficulties ranging from 6 to 12 percent.

These findings are in agreement with those of an earlier study conducted by the project team 1981-82 which sought to identify receptive language difficulties for undergraduate students.

Findings concerning instructional practices included the following results: Instructional methods identified as most effective from among a list of 35 suggested techniques revealed that: 1) lectures, 2) chalkboard, 3) textbooks, and 4) discussions in that order were considered most effective (as shown in Table III). Techniques selected as most frequently used included (Table IV): lectures, selected by all four disciplines while three of the four disciplines named discussions, chalkboard and textbooks. Two of the four used demonstrations, transparencies, outlines and recitations. Models, syllabi, content handouts and tutorials were identified in only one discipline. Less than 25% of all the techniques listed were employed in any one discipline.

The least-used techniques were: guest speakers, references, T.V. exhibits, artifacts, lab manuals, programmed materials, field trips, computer-assisted programs, and exercise sheets, among others.

In summary, the data from this study reveal that professors view: 1) vocabulary as by far the most difficult in introductory courses; 2) key principles and generalizations also pose a serious problem; and 3) metaphors or unique language forms appear to be less of a problem, but should not be dispatched as unnecessary.

Teaching techniques most frequently used included lectures, textbooks and chalkboard, which were not unlike the

educational techniques identified as most effective wherein discussions were included. Professors across the disciplines utilized only a small percentage (less than 25% of all the techniques available).

Recommendations

1. Particular attention to vocabulary and concepts should serve as an integral component of all introductory courses.
2. Generalizations, key principles, metaphors or other unique language must be taught using a wide variety of techniques and approaches.
3. More attention might be given to pre-testing of vocabulary and concepts unique to various disciplines in an effort to recognize deficiencies of students early in the course.
4. A wider range of instructional techniques and devices utilizing more creative methods might be used to assist students to overcome communication difficulties. Among those suggested by Sartain et al, were advance organizers, structured induction, reverse reasoning, and semantic mapping. Instructional devices included special transparencies, manipulative models and hierarchy charts and numerous others.
5. College instructors engaged in teaching introductory courses might be encouraged to familiarize themselves with instructional resources and devices available for inclusion in their courses.

LANGUAGES OF THE DISCIPLINES PROJECT
University of Pittsburgh

Faculty Questionnaire on Introductory Courses

1. What vocabulary items are essential for a student to learn before or during an introductory course in your field? (Please list important terms or indicate where such a list can be found.)
 - a.
 - b.
 - c.
 - d.
 - e.
 - f.
 - g.
 - h.
 - i.
 - j.
2. From observation and from test results which of the above terms have you found to be particularly difficult for many students? Please circle the letter in front of those terms.
3. Probably each discipline has a few special metaphors or other unique language forms that are introduced in early courses. What metaphors or discipline-specific expressions have you found to be somewhat difficult for new students to learn?
 - a.
 - b.
 - c.
 - d.
 - e.
 - f.
4. What key principles or generalizations must students learn early in an introductory course in order to be "literate" in this field and competent to pursue further study?
 - a.
 - b.
 - c.
 - d.
 - e.
5. Please circle the letter in front of those principles or generalizations that students seem to find particularly difficult.

6. In case the project team wants to obtain additional information from other sources, what do you consider to be the two or three best textbooks for an introductory course in your field? (Author, title, publisher)
- a.
- b.
- c.
7. What are the "classic" journal articles or monographs that a competent beginning student in this field should read? (Author, title, source)
- a.
- b.
- c.
- d.
8. Check (✓) instructional techniques that you have found to be most effective in helping beginning students overcome vocabulary and comprehension difficulties.

☐ lectures	☐ chalkboard	☐ workbooks
☐ discussions	☐ transparencies	☐ lab manuals
☐ demonstrations	☐ motion picture films	☐ exercise sheets
☐ lab experiences	☐ filmstrips	☐ programmed material
☐ role playing	☐ TV programs	☐ computer-assisted programs
☐ guest speakers	☐ videotapes	☐ charts
☐ syllabi	☐ audiotapes/records	Other: _____
☐ outlines	☐ models	_____
☐ textbooks	☐ exhibits	_____
☐ references	☐ artifacts	_____
☐ journal readings	☐ computers	_____
☐ content handouts	☐ pictures	_____
☐ tutorials	☐ field trips	_____
☐ "recitation" sessions	☐ pretests	_____

9. Circle those instructional techniques used most frequently.

Thank you very much for your contributions to the efforts of the project team in compiling and disseminating information useful to instructors of beginning students. If you have other suggestions to make, please note them on the back of this sheet.

Information
provided by
Professor: _____

College/University: _____

Field of Study: _____ Usual size of beginning classes: _____

* If convenient include any duplicated materials used in your class(es).

Instructional Techniques

1. Most Effective
2. Most Frequently Used*

<u>Instructional Techniques</u>	<u>Natural Science</u>	<u>Humanities</u>	<u>Math, Stats. Computer Ed. Accounting</u>	<u>Social Science and Professions</u>
1. lectures	*91.0	*94.1	*88.0	*83.0
2. discussions	45.5	*65.0	*75.0	*71.0
3. demonstrations	18.2	*35.3	50.0	*38.0
4. a b experiences	54.6	5.9	38.0	13.0
5. role-playing	-	24.0	13.0	38.0
6. guest speakers	-	18.0	-	13.0
7. syllabi	9.1	47.1	*36.0	21.0
8. outlines	36.3	*18.0	25.0	33.3
9. textbooks	*55.00	53.0	*63.0	*50.0
10. references	-	24.0	-	8.3
11. journal readings	-	12.0	13.0	21.0
12. content handouts	18.2	47.1	50.0	*58.3
13. tutorials	18.2	18.0	25.0	*33.3
14. recitation	*45.5	29.4	50.0	*21.0
15. chalkboard	64.0	*65.0	*75.0	*75.0
16. transparencies	*64.0	18.0	38.0	25.0
17. motion picture	18.2	29.4	-	21.0
18. filmstrips	9.1	18.0	-	4.2
19. TV	-	-	-	4.2
20. video	18.2	24.0	-	-
21. audiotapes	18.2	18.0	-	13.0
22. models	*45.5	12.0	25.0	8.3
23. exhibits	-	12.0	-	-
24. artifacts	-	-	-	-
25. computers	9.1	-	63.0	-
26. pictures	18.2	24.0	-	8.3
27. field trips	9.1	18.0	-	17.0
28. pre-tests	18.2	18.0	13.0	17.0
29. workbooks	18.2	12.0	25.0	21.0
30. lab manuals	9.1	-	13.0	4.2
31. exercise sheets	-	18.0	50.0	38.0
32. programmed material	9.1	-	-	13.0
33. computer assisted	-	-	13.0	8.3
34. charts	18.2	12.0	-	21.0
35. other	-	-	13.0	29.2

*represents those techniques most frequently used

ESSENTIAL VOCABULARY ITEMS LISTED BY PROFESSORS

Natural Sciences

A	* associative	M	curve	M
	* asymptote	M	conclusion	M
	* alternative hypothesis	M	coordinate	M
	* angular velocity	Phys	center	M
	* atomic weight	Ch	cellular respiration	Bl
	* acid	Ch		
	approximate	M	D death	BT
	approximation	M	data	(CE), BT
	area	M	decimal	Ch, M
	altitude	M	disjoint	M
	axis	M	difference	M
	algebraic	M	definition	M
	atom	Ch, Ch	distance	M
	add	Ch	directrix	M
	argument	(c) M	digit	M
	action potential	Bi	denominator	M
	acceleration	Phys	depolarization	Bl
	angular	Phys	* derivative	M
			diffraction	Phys
B	*biased	stat		
	*base	stat, Ch E	* estimators	Stat
	biology	ST	* entropy	Phys
			* electrostatic potential	Phys
C	*commutative	N, M	* explicit	M
	*confidence interval	M, M	electron transport	Bl
	*correlation	M-St (THR)	element	Ch, M
	*chi square distribution	M-St	electronegativity	Ch, Ch
	*central limit theorem	St	equation	M Ch
	*continuity	M	equality	M
	*contrapositive-statement	M	equivalent	M
	*chemical equation	Ch	equivalence	M
	*chivality	Ch	ellipse	M
	*configuration	Ch	exponent	M
	*cubic	M	exponential	M
	circle	M	even	M
	chord	M	equidistant	M
	condition	M	energy level	Ch
	correspondence	M (BE)	energy	Ch
	centromere	Bl	equilibrium	Ch
	centrosome	Bl		
	centroile	Bl	F frequency distribution	St
	concavity	M	function	M, M, M
	common sense	BT	factor	M, M
	compound	Ch	fact	St
	chemical change	Ch	formula	Ch
	condensation	Ch	focus	M
	conformation	Ch	force	Ch
	coefficient	M	* fraction	M
	complement	M	factorization	M

G	graph	M	M	mid-point Mass	phys phys
H	* horizontal	M, Stat	N	* null hypothesis	M, Stat
	histogram	Ch		* normal distribution	Stat
	hydrolysis	M		* necessary and sufficient	M
	height	M		* nucleophile	Ch
	hyberbola	Bi		* neighborhood	M
	heterozygous	Bi		non-life	Br
	heterotrophic	Bi		non-linear	M
	hyper and hypotonic			negative	M
				number	M
I	* integral	M		numerator	M
	* inertia	Phys		nomenclature	Ch
	* interval	M		necessity	M
	* implicit	M			
	infinite	M	O	* operations	M
	infinity	M		* oblique	M
	intercept	M		order	M
	inequality	M		ordering	M
	imply	M		opposite	M
	implications	M		odd	M
	inequation	M		orbital	Ch
	integer	M			
	imply	M	P	* proof b/ contradiction	M
	image	M		* polarity	Ch
	ions	Ch		* perpendicular	M
	inertia	Phys		* parallel	M
				* product	M
J				* parameter	M
K	kinetic energy	Ch		positive	M
				prime	M
L	* level of significance	M-Stat		point	M
	* limit	M		proof	M
	life	Bi		polynomial	M
	line graph	M, Stat		photosynthesis	Bi
	like-terms	M		power	Ch, M. (PS)
	logarithm	Ch, M			(Ps) (PS)
	logarithmic	M		polarization	Phys
	linear	M		photophosphorylation	Bi
	length	M	Q	* quotient	Ch
	locus	M		* quadratic	M
	lemma	M		* quantum	Phys
	line	M			
	longitude	Phys	R	* random number	Stat
	latitude	Phys		* reciprocal	M
M	* magnetic induction	Phys		ratio	M
	* mole	Ch, Ch		regression	M
	mean	M-Stat		refraction	Phys, Phys
	momentum	Phys, Phys		religion	BT
	magic	Bi		reaction	Ch
	molecular weight	Ch		root	M
				remainder	M
				Radius	M

R	relation	M
	reflection	M
	radical	M
	repository	Bi
S	* specify	M
	* specification	M
	* secant	M
	* slope	
	subset	M
	sum	M
	science	St
	solution	M
	symmetric	M
	symmetry	M
	solute	Ch
	solvent	Ch
	synthesis	Bi
	sufficiency	M
T	* type I error	M-Stat
	* type II error	M-Stat
	* t-distribution	Stat
	* tests of hypothesis	Stat
	* tables	Stat
	* tangent	M
	transcendental	M
	theorem	M
	torque	Phys
U	unique	M
	uniqueness	M
	unknown	M
	unbiased	Stat
	unit	M, Th
	union	M
	unbounded	M
V	* variable	M, M, (P)
	* vertical	M
	volume	M
	vertex	M
W	Width	M

Natural Science

M Mathematics
 Stat Statistics
 Bi Biology
 BT Botany
 Ch Chemistry
 Phys Physics

* Particularly difficult

() Also appear in other disciplines
 (Th-R) Therapeutic Recreation
 (C) Communications
 (BE) Business Education
 (CE) Computer Education
 (PS) Political Science
 (P) Psychology

HUMANITIES

A *	analogue	EL	deductive reasoning	C
*	allegory	E	diacritic mark	L
	agreement	PL	devoiced	L
	aside	EL	daughter languages	
	adjective	L, E	distinctive features	L
	adverb	L, E	dental	L
	act	Th		
	argument	Ph. 1	E Elizabethan	EL
	articulatory features	L	echo	E
	affixes	L	essay	AL
	allophone	L	empiricism	Ph. L
	apico-dental nasal	L	ethos	C
	apico-alveolar nasal	L		
	alveolar	L	F feedback	Sis C
			French Scene	Th
B *	beat	Th	free-will	Ph. 1
	bound morpheme	L	fact	C
	bathos	EL	fricatives	L
C *	coherence	E	G *genre	E, EL
*	cohesion	E	grammatical	E
*	catharsis	AL	given circumstances	Th
*	communicative competence	LM	glossed	L
*	construct	LM	grammatical function	L
*	characterization	In F		
	conditioned consonant	L	H heroic	Int F
	comparative study	L		
	channel	SLS	I *irony	EL
	critical listening	SLS	*imagery	EL
	character	EL, E	*irony	AL, AL
	characterization	EL	image	E E
	comedy	EL	irony	E
	convention	EL	invention	E
	chronology	AL	information	C
	counter-example	Ph. 1	implementation	C
	contradiction	Ph. 1	interdependence	C
	contrary	Ph. 1	inductive reasoning	C
	causation	Ph. 1		
	communicative competence	LM	J jargon	EL
	conflict	In F		(SL) (BE)
	classical	In F	K	
	consonantal	L		
	code switching	SL	L linguistics	LM
D *	dramatic action	Th	listening	SLS
*	decorum	Th	logos	C
	dialogue	EL	Labiovelars	L
	dilemma	Ph. 1	labialized velar stops	L
	determinism	Ph. 1	lexicon	SL
	discussion	C		
	dialect (national, social)	SL		

Humanities

M *	metaphor	E, E, EL, AL	Q		
	metaphysical	Ph. 1			
	murmured	L			
	murmured stops	L	R *	realism	LM
*	myth	E		rationalism	Phil
*	mood	Th		romantic	Int. P
*	mode	Int F		recondite	Phil
				rhetoric	C
				rhetorical strategy	C
N	noise	SLS		resonance	C
	noun	E, L		replacive	L
	narrator	E, AL			
	nominalization	E	S *	standard deviation	LM (soc)
	nasalisation	L		* symbol	EL, M,
	noun declension	L			E, E
	noun stem	L		* satire	AL
				* special world	Th
O	omniscient	AL		setting	EL, int. F
	ontology	Ph. 1		soliloquy	EL
	optimum	C		subject	E, L
	objects	L		speaker	E
	oral stops	L		simile	E, AL
				scene	Th
P *	polar attitude	Th		syllogism	C
	PIE	L		syntactic	C
	pitch	L		semantic	C
	phoemic inventory	L		subjects	L
	phonemic	L		strongly labialized	
	phonetic	L		fricative	L
	phonetically conditioned	L		stress	L
	phonemic contrast	L		stems	L
	phonological rule	Fl		suffix	L
	parts of speech	EL, E,		stops	L
		Int. F		syllabic	L
	point of view	EL		stressed syllable	L
	protagonist	EL		subordinate clause	L
	predicate	E		syntax	SL
	persons	E	T *	tone	EL
	preposition	L		* theme	E, Int. F
	persuasion	C		tense	EL
	problem	C		tragedy	EL
	pathos	C		theme	EL
	proposition	C		time line	AL
	premise	C		theory	C
	phonological	C.		thesis	C
	proto-Indoeuropean	L		(traditional phonemic)	L
	proto-Germanic	L		(diagram)	
	pathos	EL		tenses	L
	plot structure	EL		transitive verb	L
	phoneme	L			
	phonology	SL			

U	Unit	Th, M
	universal	Intr. F
	unrounded vowel	L
V	Variation in speech	SL
	verb	E, L
	valid	Phil
	vocal inflection	C
	vowels	L
	voiced apical stop	L
	voiced intermediate	L
	fricative	L
	vowel matrix	L
	voiced stops	L
	velars	L
	voiced aspirate	L
	voiceless fricatives	L
	voiced aspirated stops	L
	voiced obstruents	L

Humanities

EL	English Literature
E	English
FL	Foreign Language
SLS	Study Listening skills
Phil	Philosophy
C	Communications
L	Linguistics
AL	American literature
Th	Theatre
LM	Linguistic measurement
InF	Introduction to Fiction
SL	Sociolinguistics
*	particularly difficult
()	Also appears in other disciplines
(Soc)	Sociology

PROFESSIONS

A	ambulatory care	N	DOS	CE	
	assessment data	N	developmental systems	SW	
	*aptitude	BE	dataline	BE	
	asset	AC	dexterity	BE	
	alphanumeric	CE	data categorization	N	
	ASC II (American	CE			
	standard code for		E	expense	AC
	international			editor	CE
	interchange)			error	CE
	assumptive knowledge	SW		execute	CE
	alphabetical	BE		external storage	CE
	attire	BE			
	aptitude testing	BE	F	finger rhythm	BE
	abstract	L		*flexibility	BE
				file	CE
B	basic	CE		filename	CE
	BIT (binary digit)	CE		flowcharting	CE
	BUG (error)	CE		fortran	CE
	BYTE (group of binary	CE		filmstrip	L
	bits)			formulating references	N
	business readiness	BE			
	*bias-oriented questions	BE, BE	G	graphics	CE
				generalist	SW
C	card catalogue	L			
	competency	PE, H	H	hardcopy	CE
	cost	AC		hardware	CE
	code	CE		humanitarian mission	SW
	coding	CE			
	command	CE	I	input	CE
	courseware	CE		instruction	CE
	CPU	CE		interactive	CE
	CRT	CE		interface	CE
	cursor	CE		internal storage	CE
	consonant digraph	EE		interpreter	CE
	*confidentiality	BE, SW		I/O (input/output)	CE
	coding	SE		informed knowledge	SW
	communications skills	BE		interaction	BE
	cassette	LI		interested based testing	BE
	*concept framework	TC		indexing	BE
	correlation	Th-R (M)		index	L, L
		(stat)			
	correspondence	BE (M)	J	*jargon	SL, BE
D	data	CE (BT)	K	key board	CE, BE
	debug	CE		K/KILO	CE
	digit	CE		kit	L
	disk	CE			

PROFESSIONS

L	liability	Acc	specialist	SW
	load	CE	socialization process	SW
			self determination	SW
M	machine language	CE	skills and techniques	SW
	main memory	CE	space-line	BE
	memory	CE	shift-key	BE
	memory-chip	CE	spacebar	BE
	microcomputer	CE	subjective	BE
	microprocessor	CE	surname	BE
	MODEM	CE	serial	Li
	monitor	CE	subject reading	Li
	margin	BE	serial printout	L
	medial	EE	system theory	N
N	numerical	BE	T terminal	CE
	nursing process	N,N	track	CE
			temper control	BE
O	owners' equity	Acc	tape	Li
	output	CE	transparency	Li
P	peripheral device	CE	V *value belief complexis	SW
	personal computer	CE	video display unit (vdw)	CE
	plotter	CE	volatile memory	CE
	printer	CE	verifying	BE
	program	CE		
	professional code of ethics	SW	<u>Professions</u>	
	psychological testing	BE	Acc=Accounting	
	personality conflict	BE	TC Technical Communications	
	platen	BE	CE Computer Education	
	professionalism	BE	SW Social Work	
	proofreading	BE	BE Business Educ.	
	primary healthcare	N	Th-R Therapeutic Recreation	
	primary level of prevention	N	PE-H Physical Educ. and Health	
			EE Elementary Educ. Methods	
			Li Library Science	
			N Nursing	
R	roman numerals	Li		
	RAM	CE		
	read	CE		
	register	CE	* particular difficult	
	response time	CE	() Also appears in other disciplines	
	ROM	CE	(M) Mathematics	
	run	CE	(stat) statistics	
	resume	BE	(BT) Botany	
	rhythmical	BE,(L)	(L) Linguistics	
	reference book	Li		
	reserve	Li		
	relevancy	PE		
s	*social systems	SW		
	software	CE		
	storage capacity	CE		
	storage device	CE		
	store	CE		

KEY PRINCIPLES OR GENERALIZATIONS

Social Sciences

Economics Maximization of profits
 Maximization of utility
 Minimization of costs
 Calculation of expected profits
 Supply of money
 *Idea of marginal unit vs. an average unit
 *Notion of equilibrium and forces which contribute to equilibrium
 *Notion of optimization
 *Relation between demand and price
 *Relation between supply and price
 Difference between aggregate supply and demand and supply and demand for a product
 Difference between change in demand and change in quantity demanded
 Relation between interest rate and bond prices
 *Concept of scarcity/production/opportunity/cost
 Demand and supply schedules and their use
 *Production and cost functions
 The firm's response to price changes; short long run
 Concept of market power and its effect on firm behavior

Geography Grid system for location
 *Spatial point of view
 *Levels of generalization

History Socialization process
 Roles
 *Democratization
 Sociological explanations of discrimination
 Economic explanations of discrimination
 *Androgyny
 Liberated movements (Nature of)
 Sexual stereotyping

Public Administration
 Organization (as a complex concept)
 Exchanges

Political Science
 *Cybernetic process
 Input conversion output systems
 Systems analysis
 Causal explanation
 *Particularly difficult

Political Science continued

Judicial view
 "The people"
 Public policy
 Policy making
 Decision making
 Democracy
 Heredity vs. Environment
 Sovereignty
 Justice
 Power
 Political socialization
 Political culture
 Political system
 Public policy
 Political processes
 Power influence
 *Notion of government as broker among many interests
 *Sheer complexity of society, political issues
 *Conflict among individual group interests
 *The outline and relevance of a country's political history
 *The role of political forms and institutions in shaping daily political events
 *The importance of comparative methods
 *Elementary familiarity with quantitative methods
 *Public policy consequences which are unanticipated
 Origins of global tendencies toward power aggression in collectives
 Distinctions between "realist" and "idealist" interpretations of history
 *Basic approach to concept of imperialism
 *Fundamentals of Cold War historiography
 Doctrinal differences between counterforce/mutual deterrence position in nuclear strategy

Psychology

Relationship between experience and behavior (various prospectives)
 Relationship between physiology and psychology (various prospectives)
 The methodology of psychological studies
 Structures of existence
 *The relationship between sensation, perception and reality; that the study of associative learning is only part of what learning, thinking, and knowing really are
 Motivation and emotion are not "will-power" and "magic", but can be described behaviorally and biologically
 Scientific Method
 Nature vs. Nurture
 Evolution
 *Particularly difficult

Sociology Reliability is not the same as validity
Perception of reality

Natural Sciences

Biology Simple chemistry
*Protein structural principles
*Laws of inheritance (ie. genetics)
Principles of gene expression
Unity and diversity of (biological) life
Relating chemical organization to organismal function
Concept of negative feedback and inter-relationships of body's regulatory system
Ecological succession
Evolution
Biochemical cycle
*Heterotroph hypothesis
*Hierarchical classification
*Molecular genetics
*Organic evolution
*Mendelian genetics
Biochemical unity of life

Chemistry Chemical reaction
Stoichiometry calculations
Oxidation reduction
Electron transfer
Limiting reactant
Molecular theory
Atomic theory
Equilibrium theory
*Acids and bases - what they are, what they do, and why they do it
Electronegativity
Stereochemistry
Hybrid orbitals
Matter made up of discrete units
The distinction between quantity (moles) and mass
Equilibrium principles
Atomic theory
Atom-molecule-small particle concept
Chemical equation
Molecular weight

*Particularly difficult

Chemistry continued

Atomic structure
 Electronic structure
 Gas laws and principles
 *Stoichiometric calculations
 *Basic bonding principle
 *Chemical mole
 *Atomic weight
 *Electron orbital
 *Ionization energy

Mathematics

Specify the variable
 "Translate to English"
 Express the condition algebraically
 Factor completely
 *The points of discontinuity of a function
 The deviation of a function
 *Solution of equations
 The principle of rejecting or failing to reject a hypothesis when the experimental evidence at hand indicates that they hypothesis has only a small or not so small change of being true
 *Rearrangement of algebraic expressions into a prescribed form
 *Translation of verbally stated problems into algebraic sentences
 *Correspondence between algebraic elements and geometric elements by way of a coordinate system
 *Determination of the solution set for an open sentence or system of open sentences (equations, inequations, etc.)

Physics

Electrostatic potential energy
 Longitude and latitude on earth
 Conservation laws
 Centripetal acceleration
 Newton's Law of Motion
 *Conservation of momentum, energy, angular momentum
 Heat as a form of energy
 *Maxwell's equations of electromagnetism
 *Laws of reflection for mirror and thin lenses

Statistics

Use of statistical tables
 *The principle of sampling from a population

HumanitiesArt

Steps in taking a piece of metal and transforming it into a piece of jewelry - sawing, filing, emerying, soldering, polishing, forming
 Fabrication of metal and castery of metal and how to design for either of these
 Forming of metal other than dealing with flat sheet
 *Particularly difficult

English

- *Writing as a problem-solving skill
- *Writing as development
- Types of logic useful in composition development
- Difference between fact and idea
- Difference between fact and opinion
- *That there is often a difference between popular opinion and refined taste
- *That the answers we get stem from the questions we ask
- *Literature as a construct of words
- Distinction between author and narrator or "implied author"
- *Distinction between literal level or meanings and figurative or implied means
- *Structure, ambiguity, coherence and unity

Foreign Language

- Grammatical terminology
- Linguistic conventions

Linguistics The phonemic principle: contrast and phonetic similarity

- Syntactic organization
- Prescriptive vs. descriptive grammar

Linguistic Measurement

- How a test's validity may be assessed
- How a test's reliability may be assessed
- Difference between integrative/analytic tests
- Difference between objective impressionistic tests

Philosophy

- Concept of perfection
- That assertions must be backed by reasoning and argument, not just declared

Sociolinguistics

- Regional variation vs. social variation
- Speech community concept

Speech Communication

- Delimiting topic ideas
- Identifying types of reasoning
- Research techniques
- Outlining
- Problem-solving process
- Whole idea of organization of content

Study Listening Skills

- Information processing

Theatre

- *Dictum of the major characters as the key to understanding the theme
- *Dictum of a play having both literal and allegorical implications
- *Particularly difficult

Professions

Accounting A=L+OE and variation theory
Debits, credit understanding (not merely memorized)
Equations and algebraic concepts
Organization and classification

Business Education

Awareness at all segments of the business community
Awareness of the codes of attire and rules of conduct for each company
Good communication skills

Computer Education

Computer components and functions
*Capabilities of computers
Limitations of computers
*Computer operation

Elementary Education Methods

North, south, east, west on maps - Flow of rivers toward a mouth

Library Science

Purpose and use of journal indexes and abstracts
How and why to use any reference materials as opposed to random searches

Physical Education

Learning theories
Analogies from theories to practical experience ie. socialization process and how it relates to sport

Social Work Dignity and worth of the individual foremost

Professional responsibility of worker
Maximum self-determination of clients
*Self-awareness in personal values and professional functioning
*Skill in use of interventive strategies
Resource systems
Planned change process
Non-judgmental empathy
Contract negotiations
Interventive techniques
Preferred conceptions, outcomes, instrumentalities

Technical Communication

Sentence structure - rules of grammar

*Particularly difficult

METAPHOR AND SPECIALIZED LANGUAGE

Social Science Metaphors

"Average vs. marginal values"
 Ceteris paribus
 Demand for money
 Indifference curve
 Isoquant-isocost lines
 Is curve
 LM curve
 Laissez Faire
 Mutatis mutandis
 Money supply
 Short vs. long run

History

Cadmeon Victory
 Dual nature of women
 Femme couverte
 Machismo
 Motive to avoid success
 Self-fulfilling prophecy
 Sexual harassment
 Napoleonic complex

Political Science

Conditional language
 Executive privilege
 *Integration/differentiation
 Implied powers
 Linkage institutions
 Preventive war/counter force pre-emption
 System (input/output/feedback)
 "The meaning of deprivation is deprivation of meaning"

Psychology

Acceptable levels of significance
 "Double-bind" situations
 Frame of reference
 Manipulation of the independent variable

Natural Science MetaphorsBiology

Active site
 Biochemical pathway
 Light and dark reactions
 Protein specificity

Chemistry Addition elimination
 Electron rich/electron poor
 Flow of energy
 Inversion or retention of configuration
 Mole of atoms
 Nucleophilic attack
 Redox reaction

Mathematics
 Cancel or reduce
 Construct a proof of the theorem
 Proof of contradiction

Physics
 Back EMF developed
 Impulse of a force
 Moment of inertia about an axis
 Phase difference between current and applied voltage in AC circuits
 Sum of the movements about a point
 Spherical coordination

Statistics
 Fail to reject a hypothesis
 Find the solution set for...
 Level of significance

Humanities Metaphors

Speech Communication
 Problem-solving is like a medical diagnostic session
 Diagnostic session

English Echo effects
 Writing is process
 Figure of speech
 Point of view

Linguistics
 Daughter language
 Backwash effect

Philosophy Morally impossible

Theatre and Drama
 Structure supports drama
 Character in action
 Playwrights are teachers

Professions Metaphors

Business Education

"Cooling down"
Speed raising

Library

Focus on your topic
Periodical indexes are the keys to the journal literature

Physical Education and Health

Body movement
"Blow it"
"Bomb"
"Fire-up"

Social Work

Instrumentalities
Outcomes
Preferred conceptions

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